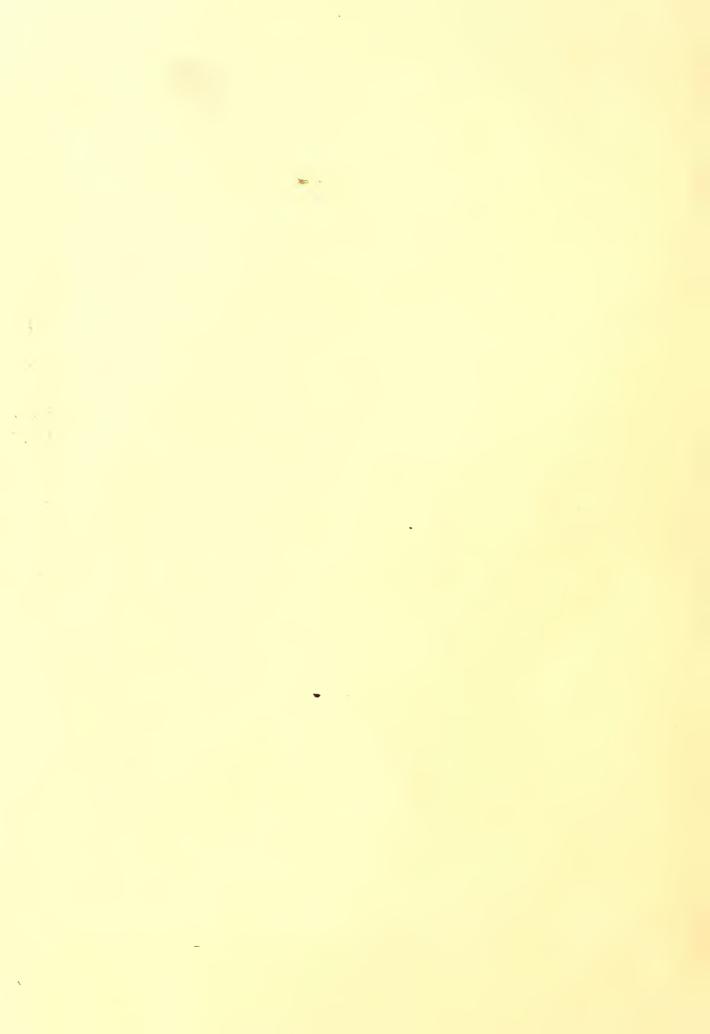
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IMPROVED METHOD OF HOLDING COTTON BOLLS FOR DETECTING PINK BOLL WORMS

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ABSTRACT

Holding cotton bolls suspected of harboring pink bollworms in a system of compact, ventilated plastic boxes in the insectary consistently reveals larger populations than can be obtained by cracking or cutting the bolls in the field. The improved data provide a better basis for assessing populations for research studies.

KEYWORDS: Pink bollworm, Pink bollworm detection, Detection technique.

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Agricultural Research Service
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In Cooperation With
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IMPROVED METHOD OF HOLDING COTTON BOLLS FOR DETECTING PINK BOLLWORMS ▷ △ ⊃ ≫

By R. E. Fye¹

INTRODUCTION

Frequently, the entomologist wishes to detect the maximum number of pink bollworms, Pectinophora gossypiella (Saunders), present in a sample of cotton bolls. Sampling by cutting or cracking the bolls, is subject to a large error due to failure to detect early instars in the boll. Slosser and Watson² showed that bolls held for about 2 weeks had more pink bollworms than did bolls examined immediately. The technique described below was developed as a convenient, compact system to hold bolls for extended periods so the full larval population could be counted.

METHODS AND MATERIALS

The holding chamber (fig. 1) consisted of a clear plastic sweater box, 35 by 37 by 9 cm, in which two circular 6-cm vents were cut in both the bottom and top. If the boxes are to be stacked and the ventilation decreased, or if the

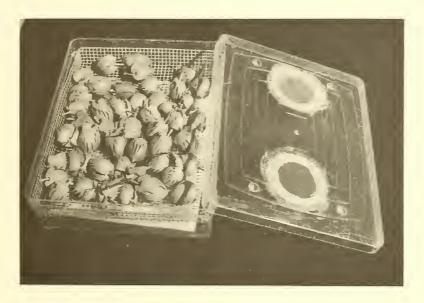


Figure 1.--Vented, plastic holding box.

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²Slosser, J. E., and Watson, T. F. Population growth of the pink bollworm, Pectinophora gossypiella (Saunders) (Lepidoptera: Gelechiidae). Ariz. Agr. Expt. Sta. Tech. Bul. 195, 32 pp. 1972.

boxes are to be used in humid areas, additional vents in the side of the boxes may be desirable to minimize condensation and mold growth. The vents were covered with fine (32 by 32 mesh) plastic screen glued tightly over the opening. The holding basket was constructed of 0.25-inch hardware cloth. The dimensions allowed the basket to rest about 4 cm above the bottom on four inverted plastic cups. A large cellulose wiper was placed in the bottom of the basket for the pink bollworms' pupation site. The box described holds a sample of 40 to 50 bolls.

RESULTS AND DISCUSSION

Table 1 gives the numbers of pink bollworms taken from companion sets of 200 vulnerable (10 to 21 days old) bolls selected at random with one set inspected immediately after cracking³ and the second set inspected after allowing the pink bollworms to emerge in the containers described above. The data compare favorably with those of Slosser and Watson.⁴

On only two dates in field 1 were more larvae detected by cracking the bolls. Through the season, a ratio of one larvae were found by cracking to two larvae detected by holding was attained in both fields. On four dates in the two fields, no larvae were detected by the cracking process, whereas the holding process indicated the presence of larvae. Generally, one to three times as many larvae were detected by holding as compared with cracking, but frequently the ratio was much higher.

The data clearly indicate that a large number of the pink bollworms will be detected by the holding method. In the comparison cited in table 1, the bolls were held in an open-air insectary with temperature regimens only slightly below those usually attained in mature cotton in the field. The detection of increased numbers may be attributed to several factors, including human error in the detection of early instar larvae, destruction of tiny larvae during the opening of the boll by cutting or cracking, and the presence of eggs upon the bracts of the bolls placed in the holding containers.

CONCLUSION

The data strongly suggest that researchers involved in detection and population dynamics of pink bollworms should consider using the holding method to better determine boll population. Age structure of the larval population may be deduced by frequently examining the bolls for emerging mature larvae and applying physiological time technique. 5

Considerable error is inherent in any sampling procedure due to individual worker variation in determining which bolls will be picked, the vulnerability of the bolls picked, and the normal variance associated with insect populations in

³Clark, E. W., and Netteroville, P. L. Simple device for opening bolls. U.S. Dept. Agr., Agr. Res. Serv. ARS-33-41, 2 pp. 1957.

⁴See footnote 2.

⁵Fye, R. E., and McAda, W. C. Laboratory studies on the development, lon-gevity, and fecundity of six lepidopterous pests of cotton in Arizona. U.S. Dept. Agr. Tech. Bul. 1454, 73 pp. 1972.

Table 1.—Comparison of numbers of pink bollworms detected on companion sets of 200 bolls

		Number of pink bollworms from 200 bolls						
	Fi	Field 1			ield 2			
Date bolls	s Examined immediately	Held 2-4 weeks	Ratio	Examined immediately	Held 2-3 weeks	Ratio		
July 9	0	0						
12	1	4	1:4	0	4			
15	1	1	1:1	2	8	1:4		
19	1 2 3	6	1:3	2	15	1:7.5		
22	3	10	1:3	6	7	1:1.1		
26	1	16	1:16	7	8	1:1.1		
Aug. 2 5	10	29	1:3	2	9	1:4.5		
5	4	3	1:0.8	0	5			
12	4	7	1:1.8	2	12	1:6		
16	1	9	1:9	0	7			
19	1	23	1:23	5 2	32	1:6.4		
23	4	20	1:5		17	1:8.5		
26	0	37		2	17	1:8.5		
30	18	70	1:3.9	17	42	1:2.5		
Sept. 2	147	368	1:2.5	17	70	1:4.1		
7	92	225	1:2.4	32	90	1:2.8		
13	207	155	1:0.7	228	300	1:1.3		
Total	496	983	1:2	324	643	1:2		

the field. Any procedure that improves the sampling should be employed. In addition, if parasitization is a consideration in a study, the survival of detected parasites is much greater when the holding technique is used. Therefore, unless an immediate assessment is needed for control, a more accurate estimation of pink bollworm population in cotton bolls may be obtained through the holding method.

⁶Kuehl, R. O., and Fye, R. E. An analysis of the sampling distribution of cotton insects in Arizona. Jour. Econ. Ent. 65: 855-860. 1972.

⁷Bryan, D. E., Fye, R. E., Jackson, C. G., and Patana, R. Releases of Bracon kirkpatricki (Wilkinson) and Chelonus blackburni Cameron for pink bollworm control in Arizona. U.S. Dept. Agr. Prod. Res. Rpt. 150, 22 pp. 1973.

⁸See footnote 2.

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